Precalc Warm Up #12-3

Simplify:

1) $3^{2n} \cdot 27 \cdot 243^{n-1}$

2) $\dfrac{9y^2(-x^{-1})^{-2}}{(-2y^2)^3(x^{-2})^3}$

3) $\dfrac{(-2)^3 \cdot 2^{-3}}{(x^{-1})^2 \cdot x^2}$

HW Questions?

EXERCISES 7.1.4 p. 206

1. Use a graphical approach to solve the following (give your answer correct to 2 d.p.).

(a) i. $2^x = 40$

2. Use a graphical approach to solve the following (give your answer correct to 2 d.p.).

(e) $\{x \mid 3^{-x} = x^2 - 1\}$

p. 208

1. Solve for x (b) $e^x = \frac{1}{e}$

2. (b) $e^{2+x} = e^{5-4x}$

3. (b) $(e^x)^2 = \sqrt{e^{x+2}}$

$$e^{2x} = (e^{x+2})^{\frac{1}{2}}$$
$$e^{2x} = e^{\frac{x}{2}+1}$$
$$2x = \frac{x}{2} + 1$$
$$4x = x + 2$$
$$3x = 2$$
$$\boxed{x = \frac{2}{3}}$$

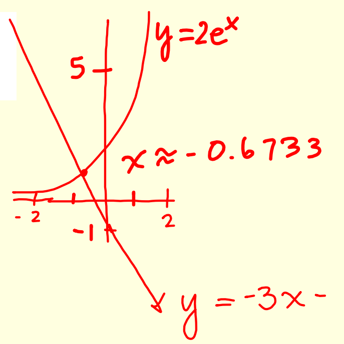
4. (b) $e^{x^2-x} = e^6$

5. (b) $e^x = 9$

6. (b) $4e^{2x} = 9$

xsd = .5

7. (b) $2e^x = -3x - 1$



8. (a) Show that if $e^{2x} + 6 = 5e^x$ then $e^x = 3$ or $e^x = 2$.

(b) Show that if $e^{2x} - 5e^x = 6$ then $e^x = 6$.

$e^x \neq -1$

$e^x \neq$ negative

$(2.7\text{ish})^x =$ positive #

Let $y = e^x$

$y^2 - 5y + 6 = 0$

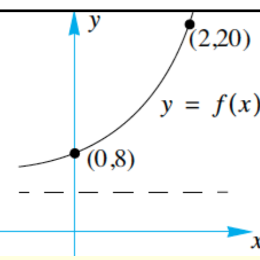
$(e^x)^2 - 5e^x + 6 = 0$

$(e^x - 3)(e^x - 2) = 0$

$e^x - 3 = 0 \quad e^x - 2 = 0$

$e^x = 3 \quad e^x = 2$

9. The graph of the function $f(x) = a \times 2^x + b$ is shown alongside.
Find the value of $f(3)$.



$8 = a(2)^0 + b \qquad 20 = a(2)^2 + b$

$8 = a + b \qquad 20 = 4a + b$

$-(8 = a + b)$

$12 = 3a$

$a = 4$

$b = 4$

$f(x) = 4(2)^x + 4$

10. Find the values of a and k if the graph with equation $f(x) = ae^{-kx}$ passes through the points $(1, e)$ and $(-1, 2e)$.

$$e = a \cdot e^{-k(1)}$$

$$e^k \cdot e^1 = \frac{a}{\cancel{e^k}} \cdot \cancel{e^k}$$

$$a = e^{k+1}$$

$$2e = a \cdot e^{-k(-1)}$$

$$\frac{2e^1}{e^k} = \frac{a\,e^k}{e^k}$$

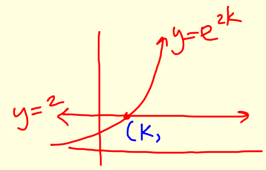
$$2e^{1-k} = a$$

$$\frac{e^{k+1}}{e^{1-k}} = \frac{2\cancel{e^{1-k}}}{\cancel{e^{1-k}}}$$

$$e^{k+1-(1-k)} = 2$$

$$e^{2k} = 2$$

$$k \approx$$



$$\ln e^{2k} = \ln 2$$

$$2k(\ln e) = \ln 2$$

$$k = \frac{\ln 2}{2}$$

$$= \frac{1}{2}\ln 2$$

$$= \ln 2^{1/2}$$

$$= \ln\sqrt{2}$$

Extra Practice - Decompose:

$$\frac{4x-2}{3(x-1)^2}$$

Decompose:

2. $$\frac{4x-2}{3(x-1)^2} = \frac{A}{3} + \frac{B}{x-1} + \frac{C}{(x-1)^2}$$

Basic Eq: $4x-2 = A(x-1)^2 + B(3)(x-1) + C(3)$

Let $x=1 \rightarrow$ $2 = 3C$ $0x^2 = Ax^2 \ldots$ $A=0$

$C = \frac{2}{3}$

Let $x=0 \rightarrow$ $-2 = A + B(3)(-1) + \frac{2}{3}(3)$

$-4 = A - 3B$

Let $x=2 \rightarrow$ $6 = A + B(3)(1) + 2$

$4 = A + 3B$ ...

Now solve the system to get $A=0$ & $B=\frac{4}{3}$

$$\frac{\frac{4}{3}}{\frac{x-1}{1}} + \frac{\frac{2}{3}}{\frac{(x-1)^2}{1}} \quad \frac{1}{(\quad)^2}$$

$$\frac{4}{3} \cdot \frac{1}{x-1}$$

$$\frac{4}{3(x-1)} + \frac{2}{3(x-1)^2}$$

Final Exam Notes:

Handwritten only

Will be turned in at the final

HW: Final Exam Review #1

Group Quiz Tuesday
Exponents - SL Ch. 7

Have a Happy Thanksgiving!